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(54) **LIQUID RECEIVER COMBINED WITH LIQUID SEPARATOR FOR REFRIGERATION CYCLE AND MANUFACTURING METHOD THEREOF**

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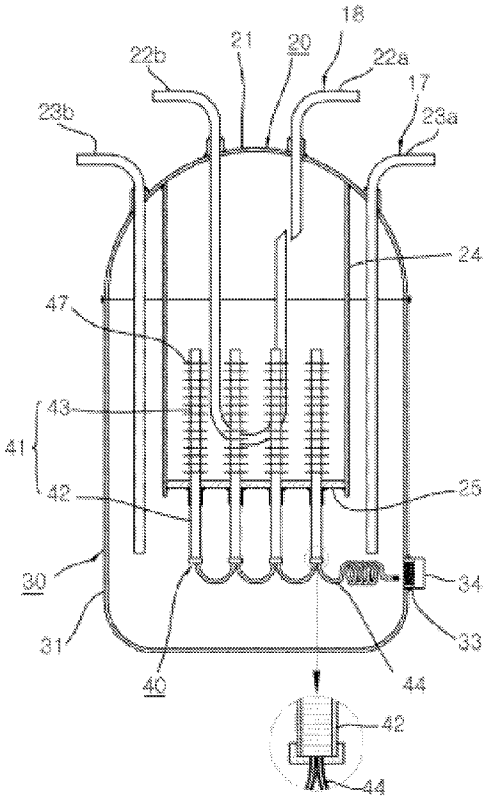
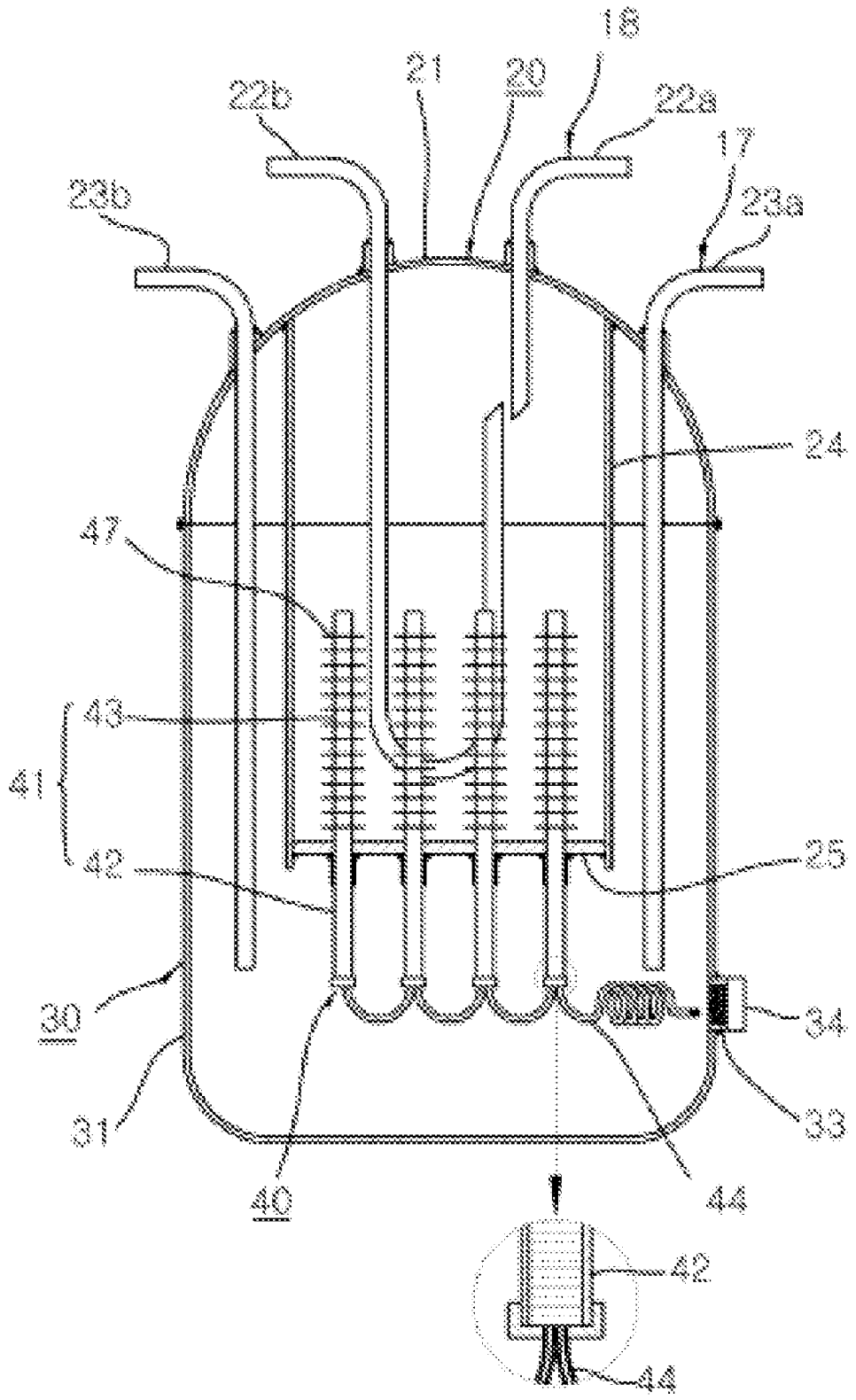
(57) **ABSTRACT**

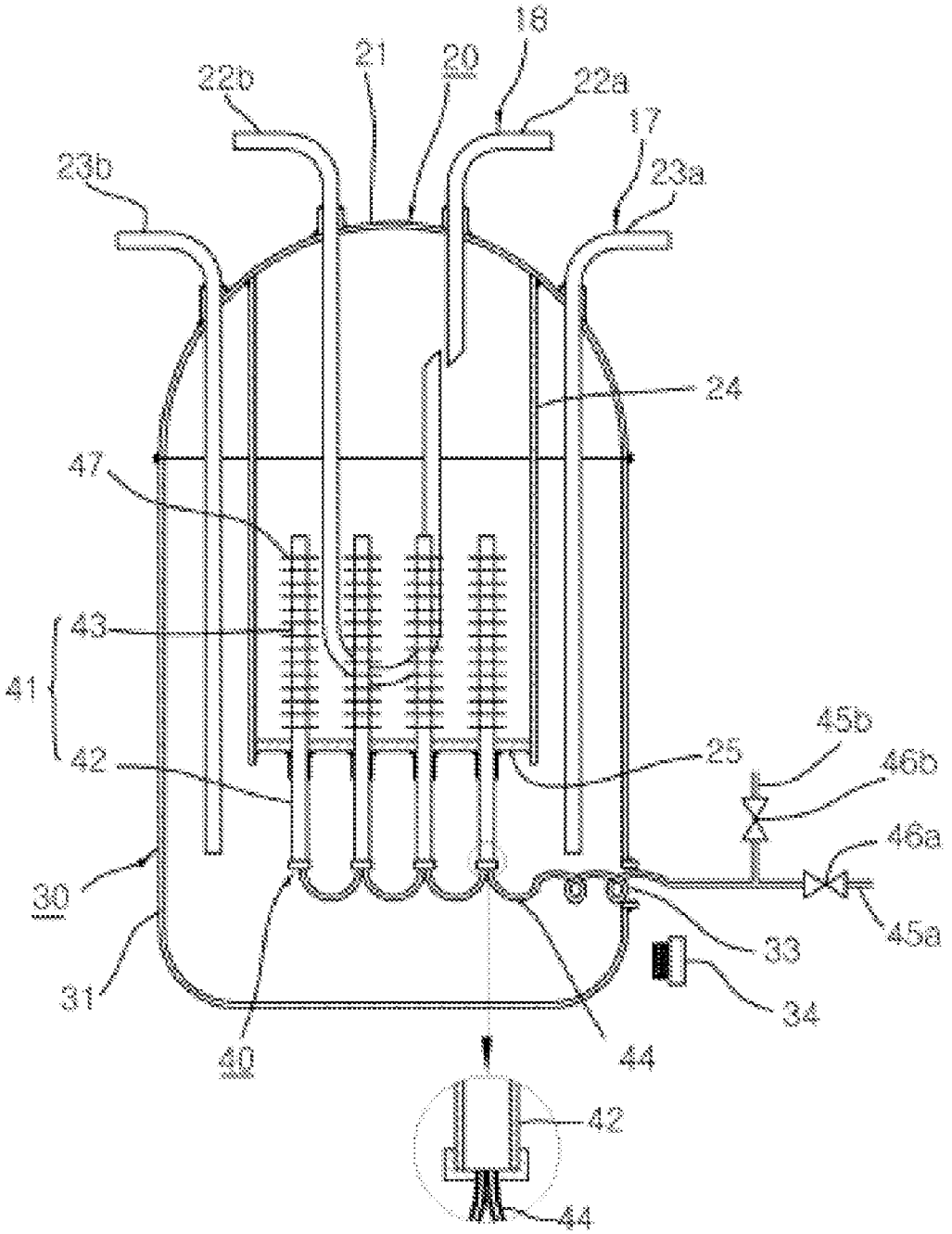
The present invention relates to a liquid receiver combined with a liquid separator for a refrigeration cycle and a manufacturing method thereof; and more particularly, to a liquid receiver combined with a liquid separator for a vapor-compression refrigeration cycle and a manufacturing method thereof, by which manpower and working hours are reduced and the defect rate is reduced, thereby improving the productivity. The present invention comprises: a liquid separator (**20**), which includes a cover (**21**) with a cut portion of a refrigerant vapor suction conduit (**18**) and a cut portion of a refrigerant conduit (**17**) connected at the inside and outside thereof, respectively, facing each other, a cylindrical body (**24**) with the upper end coupled to the cover (**21**) in such a manner to surround the refrigerant vapor suction conduit (**18**), and a base plate (**25**) formed at the lower end of the cylindrical body (**24**); a liquid receiver (**30**), which has a main body (**31**) with the upper end being coupled to both ends of the cover, and a side wall (**32**) with an outlet opening (**33**) formed therein; and a heat pipe (**40**), which includes a plurality of main bodies (**41**) weld-bonded to the base plate (**25**) of the liquid separator, an evaporator (**42**) weld-bonded to the inside of the main body (**31**) of the liquid receiver, a condenser (**43**) weld-bonded to the inside of the liquid separator (**20**), and an exhaust pipe combined with a working fluid injection pipe (**44**) connected to the lower end of the main body (**41**) of each heat pipe in such a way to allow the heat pipe main bodies (**41**) to get interconnected in a communicating manner, whereby after a working fluid is injected to the heat pipe main bodies (**41**) an entrance of the exhaust pipe combined with the working fluid injection pipe (**44**) is cut and closed and the closure is then pushed inside the outlet opening (**33**).



[Fig 1]



[Fig 2]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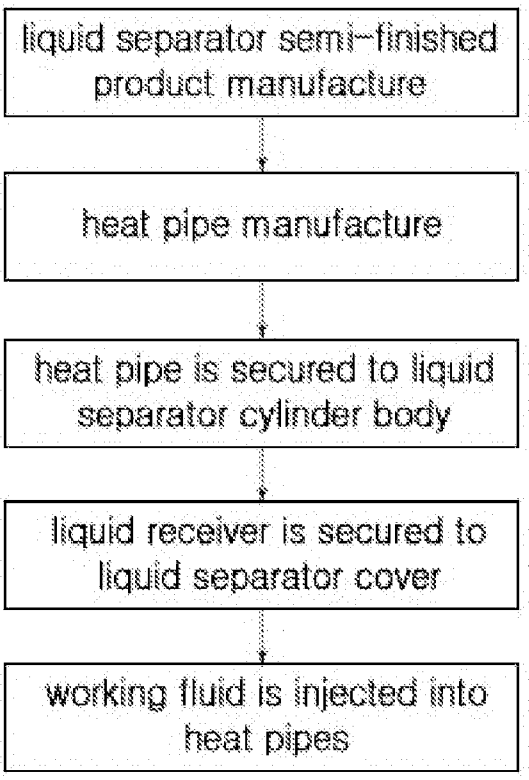
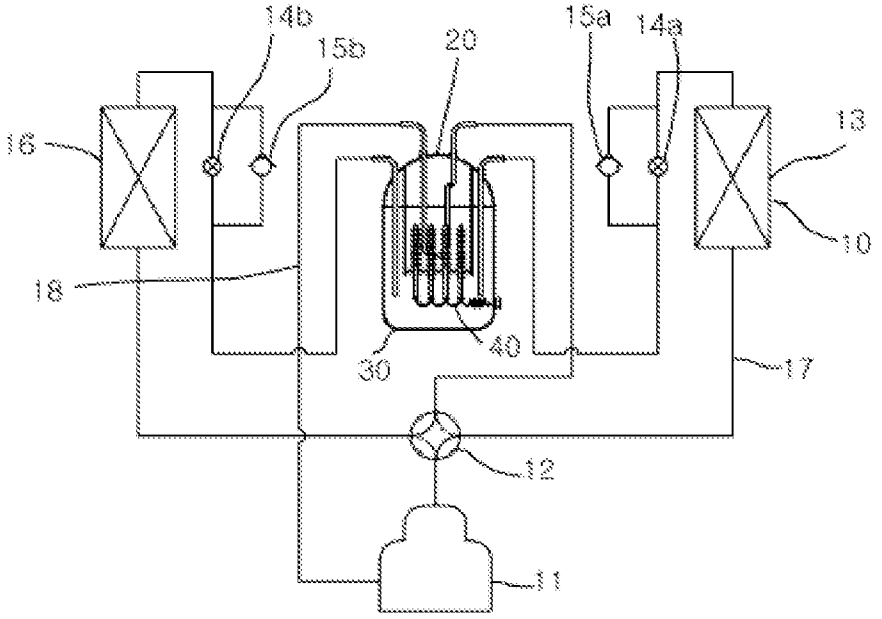
[Fig 3]


liquid separator semi-finished product manufacture
heat pipe manufacture
heat pipe is secured to liquid separator cylinder body
liquid receiver is secured to liquid separator cover
working fluid is injected into heat pipes

[Fig 4]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LIQUID RECEIVER COMBINED WITH LIQUID SEPARATOR FOR REFRIGERATION CYCLE AND MANUFACTURING METHOD THEREOF

TECHNICAL FIELD

[0001] The present invention relates to a liquid receiver combined with a liquid separator for a refrigeration cycle and a manufacturing method thereof, and in particular to a liquid receiver combined with a liquid separator for a vapor compression refrigeration cycle and a manufacturing method thereof.

BACKGROUND ART

[0002] A refrigeration cycle generally applied to both a refrigerator and a heat pump works in details on a compressor, a 4-way valve, an indoor heat exchanger, an expansion valve and an outdoor heat exchanger which are sequentially interconnected through refrigerant conduits. The 4-way valve and the compressor are connected by a refrigerant vapor suction conduit. In the mode of the refrigerator, a high temperature and high pressure refrigerant vapor compressed by the compressor is condensed passing through the outdoor heat exchanger, and the refrigerant liquid is evaporated passing through the indoor heat exchanger, the vaporization heat generated during which is used to generate refrigeration effects. The low temperature and pressure refrigeration vapor evaporated passing through the indoor heat exchanger passes through the suction conduit and is inputted into the compressor. In the mode of the heat pump, a high temperature and high pressure refrigerant vapor compressed by the compressor is condensed passing through the indoor heat exchanger, the condensation heat generated during which is used to generate heating effects. The refrigeration liquid condensed by the indoor heat exchanger is evaporated passing through the outdoor heat exchanger, and the evaporated refrigerant vapor is inputted into the compressor through a refrigerant suction conduit.

[0003] The refrigeration cycle additionally needs, as accessory devices, a liquid receiver generally installed at an outlet (a high pressure side) of the indoor heat exchanger or the outdoor heat exchanger which respectively operates as a condenser, and a liquid separator generally installed at an outlet (a low pressure side) of the indoor heat exchanger or the outdoor heat exchanger which respectively operates as an evaporator. The liquid receiver serves to temporarily store a high temperature and high pressure refrigeration liquid condensed by the condenser, thus smoothly supplying refrigerant to the evaporator even when a refrigeration work load or a heating work load changes. The liquid separator serves to prevent the refrigeration liquid from inputting into the compressor, thus preventing the damages of the compressor which might occur owing to a liquid back phenomenon and a liquid hammer phenomenon both occurring during liquid compressions.

[0004] In the above refrigeration cycle, when the refrigerant is supplied to the evaporator by the amount needed in the course of the vaporization in the evaporator after it is properly adjusted by the expansion valve, the refrigerant could remain in a dry-saturated vapor state; however when the amount of the refrigerant adjusted by the expansion valve exceeds the optimum amount of the refrigerant evaporated as it passes through the evaporator, the vaporization efficiency becomes poor as the refrigeration load decreases, and the separation of the refrigerant vapor and the refrigerant liquid could not be properly conducted. In this event, the refrigerant liquid might be inputted into the compressor, thus causing a compressor damage prevention function not to properly work.

[0005] The same applicant as the present invention's applicant filed a liquid receiver combined with a liquid separator for a heat pump system (hereinafter referred to Korean patent document 1) after an applicant's long time research in an attempt to overcome the above technical problems.

[0006] The liquid receiver combined with a liquid separator for a heat pump system disclosed in the Korean patent document 1 is characterized in that a liquid receiver combined with a liquid separator is connected between an indoor heat exchanger or an outdoor heat exchanger (condenser) and an outdoor heat exchanger or an indoor heat exchanger (evaporator) of a refrigerant conduit, and a liquid separator is connected in the middle of the refrigerant suction conduit, and a working fluid such as distilled water, alcohol, or the like is vacuum-filled into a liquid receiver combined with a liquid separator, thus constituting a plurality of heat pipes which consequently serve to repeatedly perform vaporization and condensation cycles, with an evaporator being secured at a liquid receiver, a condenser being secured at a liquid separator.

[0007] The liquid receiver combined with a liquid separator for a heat pump system is characterized in that when a refrigeration cycle is applied to a refrigerator or a heat pump, a high temperature and high pressure refrigerant liquid condensed by an outdoor heat exchanger or an indoor heat exchanger (condenser) is inputted into a liquid receiver, thus heating an evaporator of a heat pipe, so the working fluid inputted into the interior is evaporated, and the refrigerant liquid is over cooled, and the working liquid evaporated by the evaporator moves to the condenser.

[0008] The wet-saturated refrigerant vapor evaporated by the indoor heat exchanger or the outdoor heat exchanger (evaporator) is inputted into the liquid separator when it is sucked into the compressor through the refrigerant suction conduit and is heated by the heat radiation of the working fluid evaporated toward the condenser of the heat pipe and is converted to a dry-saturated refrigerant vapor or an overheated refrigerant vapor and is inputted into the compressor. The working fluid condensed by the condenser moves downward toward the evaporator, and then is re-evaporated, the cycle of which is repeatedly performed.

[0009] The liquid receiver combined with a liquid separator for a heat pump system of the Korean patent document 1 with a simple construction is basically directed to enhancing a performance coefficient as a refrigerant liquid condensed by an outdoor heat exchanger or an indoor heat exchanger is over cooled, and a wet-saturated refrigerant vapor sucked into the compressor is dry-saturated or over evaporated, which results in effectively preventing both a liquid back phenomenon and a liquid hammer phenomenon in a compressor, thus manufacturing a reliable compressor.

[0010] Korean Patent Document 1: KR 10-0484243(B1)

[0011] The conventional liquid receiver combined with a liquid separator for a heat pump system has some advantages that it has a simple construction, and a refrigerant liquid of a refrigeration cycle is over cooled, and a wet-saturated refrigerant vapor is dry-saturated or overheat evaporated; however in the conventional liquid receiver combined with a liquid separator for a heat pump system has the disadvantages that a

high pressure part and a low pressure part (a high temperature and high pressure refrigerant liquid and a low temperature and pressure refrigerant vapor) is welded in an attempt to prevent leakage between the same. As the heat pipe is fixedly secured at a lower surface of the liquid separator by a welding method, a working fluid is over expanded in the event that a working fluid is previously vacuum injected into a heat pipe, thus damaging the heat pipe which results in making the operation impossible.

[0012] Alternatively, when the heat pipes are welded to the lower surface of the liquid separator, it is proposed that the bodies of the heat pipes are first welded, and then a working fluid is vacuum injected into each heat pipe body. In this event, the number of work processes and work time significantly increase, so the manufacture of the system inevitably costs a lot.

[0013] What a plurality of heat pipe bodies are fixedly welded at regular intervals to a lower surface of the liquid separator, and then working fluid is vacuum injected into each heat pipe body, is same as a liquid separator and a liquid receiver secured to each heat pipe body are separately manufactured, and then a working fluid is injected into each heat pipe body. So, when a working fluid is vacuum injected into a heat pipe body or a liquid receiver is welded to a liquid separator, lots of defective products are manufactured due to the damages of the heat pipes filled with working liquid. Since careful works are needed for preventing the damages of the heat pipes, productivity lowers, and the manufacture of the products costs a lot.

DISCLOSURE OF INVENTION

[0014] Accordingly, it is an object of the present invention to provide a liquid receiver combined with a liquid separator for a refrigeration cycle and a manufacturing method thereof which make it possible to significantly reduce the number of work processes and work time as well as defective products, thus significantly enhancing productivity.

[0015] To achieve the above objects, there is provided a liquid receiver combined with a liquid separator for a refrigeration cycle which comprises a liquid separator formed in such a way that a refrigerant vapor suction conduit and a refrigerant conduit are cut, and the refrigerant vapor suction conduit is extended into a cover at an inner side of the cover, and the refrigerant conduit is extended into the cover at an outer side of the cover, and an upper side of a liquid separator cylinder body is secured to the cover in such a way to surround the refrigerant vapor suction conduit, and a liquid separator lower plate is formed at a lower side of the liquid separator cylinder body; and a liquid receiver formed in such a way that an upper side of the liquid receiver body is secured to both sides of the cover, and an outlet is formed at a side wall, wherein a plurality of heat pipe bodies are welded to the liquid separator lower plate, respectively, and the evaporator is disposed in the liquid receiver body, and the condenser is disposed in the liquid separator, and the exhaust conduit-combined working fluid injection conduit is secured to the lower side of the heat pipe bodies, thus making the heat pipe bodies to communicate with each other, and an inlet portion of the exhaust conduit-combined working fluid injection conduit is cut and closed after a working fluid is injected into the heat pipe bodies, respectively, and then the closed portion is pushed into the inner side of the outlet hole.

[0016] To achieve the above objects, there is provided a manufacturing method of a liquid receiver combined with a liquid separator for a refrigeration cycle which comprises a liquid separator semi-finished product manufacture step in which a refrigerant vapor suction conduit and a refrigerant conduit are cut, and the refrigerant vapor suction conduit is extended into a cover at an inner side of the cover, and the refrigerant conduit is extended into the cover at an outer side of the cover, and an upper side of a liquid separator cylinder body is secured to the cover in such a way to surround the refrigerant vapor suction conduit; a heat pipe manufacture step in which a center of each heat pipe body is fixedly secured to a liquid separator lower plate, and an exhaust conduit-combined working liquid injection conduit is connected to a lower side of each heat pipe body in such a way to make the heat pipe bodies to communicate with each other; a step in which a liquid separator lower plate to which the heat pipe is fixed is secured to a lower side of the liquid separator cylinder body, and a condenser of each heat pipe body is dispose in the liquid separator cylinder body; a step in which an upper side of the liquid receiver body with an outlet hole at a side wall is secured to both sides of the cover, and the exhaust conduit-combined working fluid injection conduit is extended through the outlet hole; and a step in which a vacuum generation means is secured to the exhaust conduit-combined working fluid injection conduit, thus vacuuming the heat pipes, and a working fluid is injected into the heat pipe bodies, respectively, and an inlet side of the exhaust conduit-combined working fluid injection conduit is closed, and the closed inlet side is pushed into the interior of the liquid receiver body, and then the outlet hole is closed.

Advantageous Effects

[0017] The liquid receiver combined with a liquid separator for a refrigeration cycle according to the present invention is advantageously characterized in that a liquid receiver is secured to a liquid separator, and a plurality of heat pipe bodies are secured to a lower surface of the liquid separator, and a working liquid is concurrently injected into a plurality of heat pipe bodies through a working fluid injection conduit also functioning as an exhaust conduit, so the number of work processes and work time can be significantly reduced. Since a working fluid is injected into a plurality of heat pipes, respectively, through a working fluid injection conduit also functioning as an exhaust conduit after the whole construction is assembled in a state that a working fluid is not injected into heat pipe bodies, so it is possible to protect the heat pipe bodies from damages, which results in lowering defects, whereby to reduce the number of work processes and work time for thereby saving manufacture cost.

[0018] The method for manufacturing a liquid receiver combined with a liquid separator for a refrigeration cycle according to the present invention is advantageously characterized in that the whole construction of a liquid receiver combined with a liquid separator is assembled in a state that a working liquid is not injected in a heat pipe body, and then a working fluid is concurrently injected into each heat pipe body, thus reducing the damages of heat pipe bodies and defects in the products. As a working fluid can be concurrently injected into multiple heat pipe bodies, the number of work processes and work time can be significantly saved for thereby enhancing productivity and saving manufacture cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The present invention will become better understood with reference to the accompanying drawings which are

given only by way of illustration and thus are not limitative of the present invention, wherein;

[0020] FIG. **1** is a cross sectional view illustrating an embodiment of the present invention;

[0021] FIG. **2** is a view illustrating a construction before a working liquid is injected into a heat pipe body according to an embodiment of the present invention;

[0022] FIG. **3** is a flow chart of a manufacturing process according to an embodiment of the present invention; and

[0023] FIG. **4** is a view of an installation example according to an embodiment of the present invention.

MODES FOR CARRYING OUT THE INVENTION

[0024] FIG. **1** is a cross sectional view illustrating an embodiment of the present invention, and FIG. **2** is a view illustrating a construction before a working liquid is injected into a heat pipe body according to an embodiment of the present invention, and FIG. **3** is a flow chart of a manufacturing process according to an embodiment of the present invention, and FIG. **4** is a view of an installation example according to an embodiment of the present invention. The present invention comprises a liquid separator **20**, a liquid receiver **30** and heat pipes **40**.

[0025] The liquid separator **20** is manufactured in such a way that a refrigerant vapor outlet conduit **22***b* is welded at an arc shaped cover **21** in a hooked shape, and a middle portion of a refrigerant vapor suction conduit **18** is cut, thus forming a refrigerant vapor inlet conduit **22***a* at a portion opposite to the refrigerant vapor outlet conduit **22***b*. A middle portion of a refrigerant conduit **17** is cut, thus forming opposite refrigerant outlet and inlet conduits **23***a* and **23***b*, respectively, at the outer portions of the refrigerant vapor inlet conduit **22***a* and the refrigerant vapor outlet conduit **22***b*. In addition, the upper end of a liquid separator cylinder body **24** is welded to an inner side of the cover **21** in such a way to surround the refrigerant vapor inlet conduit **22***a* and the refrigerant vapor outlet conduit **22***b*, and a liquid separator lower plate **25** is welded to a lower side of the liquid separator cylinder body **24**.

[0026] Here the liquid receiver **30** is manufactured in such a way that the liquid receiver body **31** is formed to have a U-shaped cross section, and an upper side of a side wall **32** of the same is welded to the cover **21**, and an outlet hole **33** of the exhaust conduit-combined working fluid injection conduit **44** is formed at the side wall **32**, and a working fluid such as distilled water, alcohol or the like circulating through the vaporization and condensation cycles is injected into the heat pipe body **41** and is blocked by a plug **34**.

[0027] The heat pipe **40** is welded so that a plurality of heat pipe bodies **41** (in which a working fluid is not yet filled) are disposed at the liquid separator lower plate **25**, and the evaporator **42** is disposed in the liquid receiver body **31**, and the condenser **43** is disposed in the liquid separator cylinder body **24**. The exhaust conduit-combined working fluid injection conduit **44** is connected to the lower side of each heat pipe body **41** in such a way to communicate with each other. A working fluid is filled into the heat pipe body **41**, and the inlet of the exhaust conduit-combined working fluid inlet conduit **44** is blocked and inserted into the outlet hole **33** and is placed around the inner side.

[0028] The inlet portion of the exhaust conduit-combined working **44** is formed in a spiral shape for making the same freely flexible, so it is possible to more easily extract through the inlet hole **33** formed at the side wall **32** of the liquid receiver body **31** during the assembly. With the aid of the above construction, it is easier to insert the inlet side of the exhaust conduit-combined working fluid injection conduit **44** into the liquid receiver body **31** after a working fluid is filled into the heat pipe body **41**.

[0029] An exhaust conduit **45***a* and a working fluid injection branch conduit **45***b* are disposed at the inlet side of the exhaust conduit-combined working fluid injection conduit **44**, and valves **46***a* and **46***b* are installed. The valve **46***a* is opened, and a vacuum generator is connected to the exhaust conduit **45***a*, and the interior of the heat pipe body **41** is made vacuum, and the valve **46***b* is opened, and then a working fluid is injected into the heat pipe body **41**, so a working fluid can be fast injected into the heat pipe body **41**.

[0030] As shown in FIG. **4**, in the preferred embodiment of the present invention, reference character **10** represents a vapor compression type refrigeration cycle, **11** represents a compressor, **12** represents a 4-way valve, **13** represents an indoor heat exchanger, **14***a* and **14***b* represent expansion valves, respectively, **15***a* and **15***b* represent check valves, respectively, **16** represents an outdoor heat exchanger and **47** represents a fin.

[0031] The liquid receiver combined with a liquid separator according to the present invention is, in terms of its operation, characterized in that as a refrigeration cycle works on in the mode of either a refrigerator or a heat pump, a high temperature and high pressure refrigerant liquid condensed by either the outdoor heat exchanger **16** or the indoor heat exchanger **13** is inputted into the liquid receiver **30**, thus heating the evaporator **42** of the heat pipe body **41**, so the working fluid injected into the interior evaporates, and the refrigerant liquid is over cooled, and the working fluid evaporated passing though the evaporator **42** moves toward the condenser **43**.

[0032] The wet-saturated refrigerant vapor evaporated as refrigerant liquid passes through the indoor heat exchanger **13** or the outdoor heat exchanger **16** is sucked into the compressor **11** through the refrigerant suction conduit **18**, and at the same time is inputted into the liquid separator **20**. The refrigerant is heated by a working fluid evaporated toward the condense **43** of the heat pipe body **41** and is converted into a dry-saturated refrigerant vapor or an overheated refrigerant vapor and is sucked into the compressor **11**, and the working fluid condensed passing through the condenser **43** moves toward the evaporator **42**, and is re-evaporated, the cycle of which is repeatedly performed.

[0033] The liquid receiver combined with a liquid separator according to the present invention is characterized in that a liquid separator is secured to a liquid receiver, and a plurality of heat pipe bodies are fixedly secured to a lower plate of the liquid separator, and an exhaust conduit-combined working fluid injection conduit is connected to each heat pipe in such a way to make each heat pipe body to communicate with each other. A working fluid is concurrently vacuum-injected into each heat pipe body, thus significantly reducing the number of work processes and work time. The whole construction is assembled in a state that a working fluid is not filled in the heat pipe bodies, and then a working fluid is filled into the heat pipe bodies, respectively, through an exhaust conduit-combined working fluid injection conduit, thus substantially eliminating the damages of heat pipe bodies, whereby to minimize defects, and the number of work processes and work time can be minimized for thereby maximizing the productivity and saving manufacture costs.

[0034] The method for manufacturing a liquid receiver combined with a liquid separator for a refrigeration cycle according to the present invention will be described.

[0035] Step for Manufacturing Semi-Finished Liquid Separator

[0036] A refrigerant vapor outlet conduit **22***b* is welded at an arc shaped cover **21** in a hooked shape, and a middle portion of a refrigerant vapor suction conduit **18** is cut, thus forming a refrigerant vapor inlet conduit **22***a* at a portion opposite to the refrigerant vapor outlet conduit **22***b*. A middle portion of a refrigerant conduit **17** is cut, thus forming opposite refrigerant outlet and inlet conduits **23***a* and **23***b*, respectively, at the outer portions of the refrigerant vapor inlet conduit **22***a* and the refrigerant vapor outlet conduit **22***b*. In addition, the upper end of a liquid separator cylinder body **24** is welded to an inner side of the cover **21** in such a way to surround the refrigerant vapor inlet conduit **22***a* and the refrigerant vapor outlet conduit **22***b*.

[0037] Step for Manufacturing Heat Pipes

[0038] Approximately middle portions of a plurality of heat pipe bodies(not yet filled with a working fluid) are fixedly welded at a liquid separator lower plate **25**, and the exhaust conduit-combined with working fluid injection conduit **44** is connected to a lower side of the heat pipe bodies **41**, respectively, in such a way to make the heat pipe bodies **41** to communicate with each other. The inlet portion of the exhaust conduit-combined working fluid injection conduit **44** is made in a spiral shape for thereby making the same freely flexible, and the exhaust conduit **45***a* and the working liquid injection branch conduit **45***b* are formed, thus installing the valves **46***a* and **46***b*.

[0039] Step for Interconnecting Heat Pipes to Liquid Separator Cylinder Body

[0040] The liquid separator lower plate **25** to which the heat pipes **40** are fixed is welded at a lower side of the liquid separator cylinder body **24**, and the condenser **43** of the heat pipe bodies **41** is welded to be disposed in the liquid separator cylinder body **24**.

[0041] Step for Interconnecting Liquid Receiver Body to Liquid Separator Cover

[0042] The liquid receiver body **31** has a U-shaped cross section, thus manufacturing a liquid receiver **30** formed of an outlet hole **33** of the exhaust conduit-combined working fluid injection conduit **44** at the side all **32**, and the upper side of the liquid receiver body **31** is welded to both sides of the cover **21**, and the exhaust conduit **45***a* and the working fluid injection branch conduit **45***b* formed at the inlet side of the exhaust conduit-combined working fluid injection conduit **44** are extended through the outlet hole **33**.

[0043] Step for Injecting Working Fluid into Heat Pipes

[0044] A vacuum generation means(not shown) is connected to the exhaust conduit **45***a*, and the valve **46***a* is opened, thus vacuuming the heat pipes **40**, and then the valve **46***a* is closed. A working fluid string tank(not shown) is connected to the working fluid injection branch conduit **45***b*, and the valve **46***b* is opened, and a working fluid is fast injected into the heat pipes **40**, and the inlet sides of the exhaust conduit-combined working fluid injection conduit **44** are cut and closed, and the closed part is pushed into the liquid receiver body **31**, and the outlet hole **33** is closed by the plug **34** and is welded.

[0045] As described above, the method for manufacturing a liquid receiver combined with a liquid separator according to the present invention is characterized in that the whole construction of the liquid receiver combined with a liquid separator is assembled in a state that a working fluid is not yet filled in the heat pipe bodies. A working fluid is concurrently injected into each heat pipe body through the exhaust conduit-combined working fluid injection conduit, thus eliminating the damages of the heat pipe bodies, which results in decreasing defects. Since a working fluid is fast, concurrently injected into a plurality of heat pipes, the number of work processes and work time are significantly reduced, so productivity is enhanced, and manufacture cost is minimized.

1. A liquid receiver combined with a liquid separator for a refrigeration cycle, comprising:

a liquid separator formed in such a way that a refrigerant vapor suction conduit and a refrigerant conduit are cut, and the refrigerant vapor suction conduit is extended into a cover at an inner side of the cover, and the refrigerant conduit is extended into the cover at an outer side of the cover, and an upper side of a liquid separator cylinder body is secured to the cover in such a way to surround the refrigerant vapor suction conduit, and a liquid separator lower plate is formed at a lower side of the liquid separator cylinder body; and

a liquid receiver formed in such a way that an upper side of the liquid receiver body is secured to both sides of the cover, and an outlet is formed at a side wall,

wherein a plurality of heat pipe bodies are welded to the liquid separator lower plate, respectively, and the evaporator is disposed in the liquid receiver body, and the condenser is disposed in the liquid separator, and the exhaust conduit-combined working fluid injection conduit is secured to the lower side of the heat pipe bodies, thus making the heat pipe bodies to communicate with each other, and an inlet portion of the exhaust conduit-combined working fluid injection conduit is cut and closed after a working fluid is injected into the heat pipe bodies, respectively, and then the closed portion is pushed into the inner side of the outlet hole.

2. A liquid receiver combined with a liquid separator for a refrigeration cycle according to claim **1**, wherein an inlet side of said exhaust conduit-combined working fluid injection conduit is formed in a spiral shape.

3. A manufacturing method of a liquid receiver combined with a liquid separator for a refrigeration cycle, comprising:

a liquid separator semi-finished product manufacture step in which a refrigerant vapor suction conduit and a refrigerant conduit are cut, and the refrigerant vapor suction conduit is extended into a cover at an inner side of the cover, and the refrigerant conduit is extended into the cover at an outer side of the cover, and an upper side of a liquid separator cylinder body is secured to the cover in such a way to surround the refrigerant vapor suction conduit;

a heat pipe manufacture step in which a center of each heat pipe body is fixedly secured to a liquid separator lower plate, and an exhaust conduit-combined working liquid injection conduit is connected to a lower side of each heat pipe body in such a way to make the heat pipe bodies to communicate with each other;

a step in which a liquid separator lower plate to which the heat pipe is fixed is secured to a lower side of the liquid separator cylinder body, and a condenser of each heat pipe body is dispose in the liquid separator cylinder body;

a step in which an upper side of the liquid receiver body with an outlet hole at a side wall is secured to both sides of the cover, and the exhaust conduit-combined working fluid injection conduit is extended through the outlet hole; and

a step in which a vacuum generation means is secured to the exhaust conduit-combined working fluid injection conduit, thus vacuuming the heat pipes, and a working fluid is injected into the heat pipe bodies, respectively, and an inlet side of the exhaust conduit-combined working fluid injection conduit is closed, and the closed inlet side is pushed into the interior of the liquid receiver body, and then the outlet hole is closed.

4. A method for manufacturing a liquid receiver combined with a liquid separator for a refrigeration cycle according to claim **3**, wherein an exhaust conduit and a working fluid injection branch conduit are installed at an inlet side of the exhaust conduit-combined working fluid injection conduit, and then valves are installed.

5. A method for manufacturing a liquid receiver combined with a liquid separator for a refrigeration cycle according to claim **3**, wherein an inlet side of the exhaust conduit-combined working fluid injection conduit is freely flexible.

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